CLAIMS

We claim:

1. A method for imaging of ultrasound contrast agents in a region of tissue, where

- an ultrasound pulse containing frequencies in a first harmonic band and the second harmonic component of this band is transmitted towards said region,

- where the phase of said second harmonic band relative to said first harmonic band is adjusted between 0 and $\frac{\pi}{2}$ for maximal received nonlinear third and/or fourth harmonic components in the received signals from the contrast agent.

2. A method for imaging of ultrasound contrast agent according to claim I, where RF-filtering is applied on the received signals to attenuate unwanted tissue components.

3. A method for imaging of ultrasound contrast agents in a region of tissue, where

- at least two ultrasound pulses are transmitted consecutively towards said region with substantially the same focus and direction of the ultrasound beam,

- all transmitted pulses contain frequencies in a first harmonic band and the second harmonic component of this band, where the polarity of the first harmonic frequency components of said transmitted pulses are equal, and where the second harmonic component of each transmitted pulse has opposite polarity of the second harmonic component of the previously transmitted pulse,

- the scattered signal from said pulses are received with an ultrasound transducer with substantially same beam direction and focusing for said pulses, and the received signal from all or some of the transmitted pulses are combined with each other,

- so that linear and/or first order nonlinear components in the received signals from the tissue are greatly reduced in the combination of the signals.

4. A method for imaging of ultrasound contrast agents according to claim 3, where the amplitudes of said first and second harmonic frequency components of one transmitted pulse are different from the amplitudes of said first and second harmonic frequency components of another transmitted pulse.

5. A method for imaging of ultrasound contrast agents according to claim 3, where the amplitudes of both said first and said second harmonic frequency components are the same among all said transmitted pulses.

6. A method for imaging of ultrasound contrast agents according to claim 3, where only two ultrasound pulses are transmitted.

7. A method for imaging of ultrasound contrast agents according to claim 3, where the received signals from said pulses are combined through summation of the received signals.

8. A method for imaging of ultrasound contrast agents according to claim 3, where the received signals from said pulses are combined by summing the

received signals from the odd number transmitted pulses and subtracting the received signals from the even number transmitted pulses.

9. A method for imaging of ultrasound contrast agents according to claim 3, where the combination of said signals has the form of a linear filter along the pulse number coordinate for each depth range.

10. A method for imaging of ultrasound contrast agent according to claim 3, where in said transmitted pulses the phase of said second harmonic band relative to said first harmonic band is adjusted between 0 and $\frac{\pi}{2}$ for maximizing the detected signal power from the contrast agent.

11. A method for imaging of ultrasound contrast agent according to claim 1, where in said transmitted pulse(s) the phase of the second harmonic band relative to the first harmonic band is adjusted based on maximized displayed intensity of the detected contrast agent signal in the image.

12. A method for imaging of ultrasound contrast agent according to claim 1, where in said transmitted pulses the phase of the second harmonic band relative to the first harmonic band is automatically adjusted to maximizing the intensity of the detected contrast agent signal.

13. A method for imaging of ultrasound contrast agent according to claim 3, where RF-filtering is applied in addition to a combination of the received

signals to further attenuate unwanted tissue components.

14. A method for imaging of ultrasound contrast agent according to claim 3, where the ultrasound beam is swept continuously with a mechanical motion of the transducer, the motion being so slow in relation to the pulse transmit rate that the received signals from two or more transmitted pulses originate from substantially the same region in the tissue.

15. A method for imaging of ultrasound contrast agent according to claim 3, where the beam direction is stepped to form the image, and the beam direction is the same for two or more transmitted pulses that are used to form the detected signal from the contrast agent for said beam direction.

16. A method for imaging of ultrasound contrast agent according to claim 3, where in said transmitted pulse(s) the phase of the second harmonic band relative to the first harmonic band is adjusted based on maximized displayed intensity of the detected contrast agent signal in the image.

17. A method for imaging of ultrasound contrast agent according to claim 3, where in said transmitted pulses the phase of the second harmonic band relative to the first harmonic band is automatically adjusted to maximizing the intensity of the detected contrast agent signal.